American Druggist

AN ILLUSTRATED TRADE JOURNAL.

VOL. XXI. No. 7. NEW YORK, APRIL 1ST, 1892. WHOLE No. 229.

Copernicia Cerifera Mart.

WAXES OF VEGETABLE ORIGIN.

OF all vegetable productions, none, perhaps, offers more interest, both from a botanical as well as a commercial standpoint, than the vegetable waxes. Produced in various distant portions of the globe, their uses have become so extensive as to make them a necessary article in the manufacture of candles, wax matches, shoes, furniture, and pharmaceutical preparations of various kinds. Through the writings of Humboldt and Andri, and the investigations by Berard, Story-Maskelyne, Piverting, and others, we have learned much of the botanical as well as of the physical and chemical characters of this interesting class of plants.

The principal regions of the globe where these waxes are to be found embrace certain portions of Western China, Japan, and tropical America, from which enormous quantities are yearly exported, the total amount of "insect wax," as it is called, shipped from Ichang, China, in 1889 being 1,539,287 pounds, the cost of which exceeded $500,000 in gold. The exportation of the Japan wax, which has only in the last thirty-five years found its way into Europe, has also, at the present time, reached extravagant figures.

Varieties.—The chief varieties, among which are included certain substances known as "vegetable tallows or fats," comprise the following:

1. *Carnauba wax*, called also Ceará or Brazil wax.
2. *Pela wax*, or Chinese wax.
3. *Sumach wax*, or Japan wax.
4. *Kaga wax.*
5. *Ibota wax.*
6. *Stillingia tallow*, or Chinese vegetable tallow.
7. *Myrica wax*, or myrtle wax.
8. *Orizaba wax.*
9. *Wax from stick-lac.*
10. *Bahia wax.*

Alcohol, ether, chloroform, petroleum spirit, and alcoholic solution of potash exert a solvent action on the various kinds of wax met with in commerce, and the behavior of the solutions with solution of ammonia and with alcoholic solutions of lead acetate and of ferric chlo-

ride has formed a means of distinguishing them from one another. The process is as follows: A sample of the wax is heated with ten times as much chloroform to boiling, and, when completely dissolved, cooled in cold water.

1. The chloroform solution remains clear after cooling.

A. Ether dissolves completely.

(*a*) Alcoholic solution of ferric chloride gives, with the alcoholic solution of the wax, a precipitate insoluble on heating—*wax from Myrica quercifolia.*

(*b*) Ferric chloride colors alcoholic solution black—*wax from undetermined species of Myrica.*

(*c*) Ferric chloride colors brownish but gives no precipitate—*wax from Myrica Cerifera; wax from Orizaba.*

B. Ether dissolves only a part. A sample is boiled with ten times the quantity of alcoholic potash solution till saponified, and the soap heated with 100 volumes of water.

(*a*) The soap is completely soluble—*Japanese wax.*

(*b*) The soap is partially soluble—*African beeswax.*

II. The chloroform solution becomes cloudy on cooling.

A. Alcoholic solution of acetate of lead gives, with the alcoholic solution of the wax, after a few minutes' standing, a cloudiness—*wax from stick-lac.*

B. Alcoholic solution of acetate of lead gives no cloudiness.

(*a*) The ethereal solution of the wax becomes cloudy on the addition of an equal volume of alcohol—*Brazilian wax.*

(*b*) The ethereal solution remains clear—*Bahia wax.*

Carnauba wax, or Brazilian wax, is found upon the leaves of the *Copernicia Cerifera*, which grows extensively in Brazil and Paraguay, from which countries the wax is largely exported. It has been suggested that the word carnauba is probably derived from two words common to the Spanish and Portuguese—*carne*, flesh, and *uva*, grape, in allusion to the fleshy berries, which resemble to some degree the grape.

The tree itself is very striking in appearance, throwing up a straight, smooth, and slender trunk, sometimes to a height of 50 feet, from 6 to 8 inches in diameter, and surmounted by a crown of large, fan-shaped leaves which resemble those of the Southern palmetto, and of which so many fans and palm-leaf hats are manufactured.

The inflorescence is polygamous. The flowers are small, white, silky-downy, in immense panicles, the lower part of the flower stalk being at first enclosed in a stiff, husk-like spathe, which soon drops off, and each branch of the panicle in a secondary spathe. The wax is secreted by scales situated in the axillæ of the leaves, and is found on both surfaces of the scales, that on the upper surface readily detaching itself and falling to the ground when the tree is shaken. This is not the way it is collected, however; but the young leaf buds and scales are cut off, dried for a few days in the sun, then cut into pieces and powdered until all the powdery part has fallen out. This is melted in earthen vessels with a little water, and then forms the crude carnauba wax.

Carnauba wax forms a hard, brittle, amorphous, straw-yellow mass. It has a specific gravity of 0.999 and melts at 83° to 84° C. (184° F.). It consists mainly of compound ethers of melissyl alcohol, $C_{30}H_{62}O$, which may be obtained from it in considerable quantity by saponification; it also contains another alcohol, $C_{27}H_{56}O$, small quantities of resin, and a substance melting at 105° and having the composition $C_{30}H_{62}O_2$. But, according to Berard,* that portion of the wax which is soluble in alcohol is free cerotic acid, $C_{27}H_{54}O_2$, while the remainder corresponds to melyssic ether.

The wax is used, mixed with tallow, for the manufacture of candles, which are prepared in Brazil in a most primitive way. They have a yellow or dark brown color, it being very difficult to deprive the wax of its coloring matter. It is also extensively used in Europe and in the United States for preparing varnishes, waxed leathers, etc. In consequence of its great hardness it is employed to harden beeswax and stearin in the manufacture of candles. It is employed by furniture polishers and brass finishers to give a polish to their wares, and can be used to wax floors. It has been found serviceable recently in insulating electric wires.

The following reference to a Chinese variety is from a recent U. S. consular report:

The "insect wax," or "white wax," of China, is a product of the western part of the province of Sze-Chuen and of parts of the adjoining province of Koei-Choo. It is, however, in the Chien-ch'ang valley, on the An-ning River, in Western Sze-Chuen, that the wax insect most flourishes and finds its food most abundant. The whole subject of white wax was, by the direction of the English Foreign Office, thoroughly investigated by Mr. Hosie, her Majesty's consular agent at Shun-King, in Sze-Chuen, and from his report thereon the following account is taken.

It seems that in Western China, not far from the Thibetan frontier, flourishes a tree called by the Chinese "evergreen tree."

It is, in fact, an evergreen with "leaves springing in pairs from the branches; they are thick, dark green, glossy, ovate, and pointed. In the end of May and beginning of June the tree bears clusters of small, white flowers, which are succeeded by fruit of a dark purple color." It has been classified by the authorities of the Kew Gardens as *Ligustrum lucidum.* Early in the spring there appear on the bark of the boughs and twigs of this tree numerous brown, pea-shaped scales. Upon opening these they are found to contain a mass of small animals, like flour, whose movements are almost imperceptible. These are the larvæ deposited by the white wax insect, whose scientific name is *coccus pela.* These shells or scales are gathered by the Chinese about the end of April and carried to the prefecture of Chia-ting, the centre of this industry, about 200 miles from the Chien-ch'ang valley. For this journey they are wrapped in packages, each containing about 16 ounces. The utmost care is taken to protect them from the heat, as the time of the development of the larvæ into insects is near at hand, and when this occurs they make their escape.

In the vicinity of the city of Chia-ting is a plain, described by Mr. Hosie as an immense rice field.

Almost every plot of ground on this plain, as well as the bases of the mountains, is thickly edged with stumps, varying from 3 or 4 to 12 feet in height, with numerous sprouts rising from their gnarled heads. These stumps resemble at a distance our own pollard willows. The leaves spring in pairs from the branches; they are light green, ovate, pointed, serrated, and deciduous. The identity of this tree is uncertain, but it is supposed to be a species of ash, the *Fraxinus chinensis.* It is called by the Chinese "paila shu," or white wax tree.

The white wax scales, upon arrival, are made up into small packages wrapped in leaves, about twenty or thirty scales in each package, and suspended under the branches of the tree. Holes are punched in the leaves which constitute their covering, and the insects, on emerging from the scales, creep up the branches to the leaves of the tree, among which they remain thirteen days. They then descend to the branches and twigs, "on which they take up their positions, the females, doubtless, to provide for a continuation of the race by developing scales in which to deposit their eggs, and the males to excrete the substance known as white wax." It is supposed that the wax is intended by Nature to protect the scales.

The first appearance of the wax on the under sides of boughs and twigs resembles snow, but it gradually spreads over the whole branch to the depth of one-quarter of an inch. At the expiration of one hundred days from the placing of the insects on the wax tree the deposit is complete. The branches are then cut off. As much wax as possible is removed by hand, but, to secure what remains, the branches are afterward boiled. This boiling of the branches destroys the scales and their larvæ, thus necessitating the bringing of fresh scales the following year from another locality, as above described. A pound of scales, it is said, will produce 4 or 5 pounds of wax.

The wax scraped off is put into boiling water, where it melts, and, rising to the surface, is skimmed off and put into moulds. Here it solidifies, and the work of manufacture is complete. The insects, which have sunk to the bottom of the pot, are pressed out, and, when the wax

* Bull. Soc. Chim. [2] lx., 41.

has all been extracted from them, are fed to the pigs. A ton of this wax is worth at Shanghai about £200.

A tree from which the branches have been removed is not available again for three years. If the wax, is left on the tree, the male insects buried under it undergo a metamorphosis, emerging with wings in the autumn and flying away.

This article has an intrinsic value, and not a fictitious one derived from fantastic ideas as to its medicinal qualities. It is, in fact, a substance of great utility, in common use in China. It is a clear white wax, which melts only at a high temperature (160° F.), and is chiefly used to cover candles made of animal and vegetable tallow, to prevent too rapid combustion. It is used in some localities as a sizing for paper and cotton goods, a glaze for silk and polish for furniture. It is also said to be used in Southern China as a polish for stone ornaments. The reported figures of its export give only a partial idea of the proportions of the industry. Immense quantities are shipped from the ports of the Upper Yang-tse in Chinese junks, and some are sent across the mountains and via the West River to Canton. It is much used there, where thousands of pounds of it, in large round cakes, are stored away in a single room.

The introduction of foreign kerosene, now so universally used in China, has had a discouraging influence on the production of white wax. Kerosene lamps afford a cheaper light than tallow candles, and the constantly increasing use of oil diminishes the demand for wax. This affords but another example of the silent but ceaseless revolution which the entrance of foreigners into China has inaugurated in every branch of native trade. It is possible, however, that a use for this wax may be found abroad to re-establish the interesting and once flourishing industry.*

Gathering Carnauba Wax.

Japan Wax.—This wax, which is produced in Japan and chiefly exported to England, is obtained from the berry of the wax tree. This tree, not unlike the juniper tree, flourishes more especially in the southern provinces of the empire. The three principal sources in Japan are the *Rhus succedanea*, the *Rhus vernicifera*, and the *Rhus sylvestris*.

The *Rhus succedanea*, when fully developed, attains a height of about 29½ feet, and has a short trunk reaching a circumference of 39½ inches. It is covered with uniform gray bark, and has yellow wood, which contains bright sap, turning dark or black on exposure to air. The ramification is not profuse, and the leaves are placed close together at the ends of the branches. Their color is a handsome green, which turns red in autumn. Measuring from about 5¾ to 7¾ inches in length, they are imparipinnate, and have round, naked petioles. The leaflets, which form about 4 to 6 pairs, are placed opposite, being naked and rather tender. Some samples are said to have serrated leaflets.

The fruit, which usually ripens about the month of October, is gathered when ready, and cleansed from its loose outer husk—a process which is accomplished in large wooden vessels with wooden maces, similar to those in use for cleaning rice. The residual product, available for the manufacture of wax, is a bean-shaped kernel about the size of a lentil, possessing an unusual degree of hardness, of a dark-yellow wax color, and presenting a saponaceous exterior to the touch. The kernel is exposed in a sufficient degree to a steaming process, which deprives it of its extreme hardness and allows of its oily properties being more easily extracted in the pressing stage. In this process the oil is received into small earthen vessels, in which it subsequently hardens to a bluish-green mass, in the shape which it is commonly met with in home consumption.

Wax thus produced is impure, and is only suitable for certain descriptions of candles and for wax-thread manufacture for home use. In order to render it merchantable for the exporter, the following refining process is resorted to: The wax is boiled with lye until it is brought to a perfectly liquid state, and is then drawn off into a reservoir filled with clear water, the pure wax, which floats upon the surface, being removed. The wax is then bleached by being exposed to the sun's rays for about fifteen days, at the end of which time the wax presents a dirty-white, crumbling appearance and a strong tallowy smell. The boiling and bleaching are repeated, with the view of rendering the refining process still more complete, the only difference being that, instead of lye, pure water alone is employed in boiling it. The product is a clear white powder having an almost crystalline forma-

* U. S. Consular Reports.

tion. The last stage of preparation for export consists in rendering the powder a compact mass, which is effected by melting it over a fire with a little water and running it off into flat vessels. The product thus obtained, known to commerce as "vegetable" wax, differs very little from white beeswax, with which it possesses the properties of color, brittleness, and similarity in its fan-shaped fracture. The only characteristic difference may be said to be in the odor, the beeswax giving off a refreshing, aromatic scent in burning, while the tallowy smell of the Japan wax is far from being agreeable. When formerly imported this wax came in round cakes about 12 Cm. ($4\frac{1}{2}$ inches) in diameter and 2.5 Cm. to 3 Cm. (1 to $1\frac{3}{16}$ inches) in thickness, but at the present time we see it in squares, cakes, and blocks of about 143 pounds each.

When freshly broken the surface is almost white, sometimes slightly yellowish green. At the surface it has a hoary appearance, owing to a shiny, crystalline white down. Impure qualities appear in the market occasionally in dark-yellow lots, fetch a lower price, and turn darker more readily than the white variety. After being preserved for some time in solid condition, the melting point is at 52° to 53° C.; but a recent solidified sample melts at 42° C. The specific gravity of the bleached substance is somewhat above that of water. Boiling alcohol (97 per cent) dissolves it easily, but deposits it nearly all again on cooling, retaining only 3 per cent in solution. Warm ether likewise dissolves it readily, but deposits it in flakes or granular masses on cooling.

The preparation of the wax forms one of the principal industries of Kiu-Siu. The best wax is produced in Kumamoto, but does not appear in commerce, as all of it is sent to the imperial court. The best commercial wax is made in the province of Hizen and brought into commerce via Osaka. The traders in that place are more skilful in purifying and bleaching the wax than the peasants of Kiu-Siu.

In Japan it is largely used for making candles and hair pomade. The sap of the *R. vernicifera* being also largely employed for the manufacture of lacquered wares.

Kaga wax is obtained from the *Cinnamomum pedunculatum*, which grows in Japan. It is softer than Japan wax and is not seen abroad.

Ibota wax is produced by an insect upon the *Ligustrum ibotu;* it is a very fine white wax, but rarely gets into foreign markets.

Chinese vegetable tallow, or stillingia tallow, is prepared from the seed kernels, or more likely from the fruit capsules, of the *Stillingia sebifera* Mart. in China. It forms a soft, white, granular mass, which is used in China for making candles. Its melting point is 37° C.

Myrtle wax, or myrica wax, is made from the fruit of *Myrica cerifera*. It melts at 47.5° to 49° C.

[ORIGINAL COMMUNICATION.]

ON THE ELIMINATION OF THE CHIEF ERROR IN THE "FRACTIONAL" METHOD OF OPIUM ASSAY.

BY CHARLES RICE, PH.D.

THE various methods of opium assay at present in vogue may be divided into two principal groups, viz.:

1. That in which a given sample of opium is *completely* exhausted of all its soluble matter, after which this solution is concentrated and the morphine contained therein determined in one way or another.

2. That in which opium, in presence of an alkali or alkaline earth, is treated with a definite quantity of water until the latter has taken up as much as possible of the soluble matter, after which a certain portion of the solution, assumed to represent a corresponding fraction of the weight of opium, is measured or weighed off, the morphine determined in it, and the percentage calculated from the quantity found in this fraction.

To the first-mentioned group belongs the process of Dr. Squibb, with its various modifications introduced by others.

The second class is represented by the process of assay of the present U. S. Pharmacopœia; also by that of Dieterich, which was introduced into the last German Pharmacopœia; and by various other methods.

The first-mentioned class of processes, which involves the complete exhaustion of the sample of opium and the subsequent concentration of the solution, requires some time and care, and has, for this very reason, not met with general favor, although it must be said that it avoids a source of error which has so far been invariably inherent in the second group of processes, where a certain weight or measure of an aliquot portion of the opium "solution" (if we may be permitted to use this term) is assumed to represent a definite fraction of the amount of opium taken for assay.

The present U. S. Pharmacopœia directs to treat 7 Gm. of opium with 3 Gm. of lime and 70 Cc. of water, by trituration and stirring, to filter after half an hour, and to take 50 Cc. of the filtrate for the determination of the opium. These 50 Cc. of the filtrate are assumed to represent exactly 5 Gm. of opium. In fact, though the 7 Gm. of opium originally taken may have contained, perhaps, 60 per cent of soluble matter—that is, 4.2 Gm.—it is assumed that the 70 Cc. of water added to the opium did not increase in volume after having dissolved these 4.2 Gm. of extractive matter. This is an assumption which forms the source of an ever-recurring but always variable error, and though this error may be small, yet we know it is there every time.

In Dieterich's method the quantity of water added to the opium is *weighed* and not measured; and the opium solution taken for assay is also weighed, it being assumed that the opium *always* yields 60 per cent of its weight to water. That this is a fallacy needs no argument, since not only the amount of water in opium may vary greatly, but even, when two samples of opium may contain precisely the same percentage of water, the respective amounts of matter soluble in the two samples may differ from each other. Nevertheless, there is here at least an attempt to eliminate the error involved in the method previously spoken of.

Without referring to any action which the Committee of Revision may hereafter take regarding the particular process of assay of opium that may be determined on, it will be of benefit to those who prefer one of the methods belonging to the second of the before-mentioned groups, to be shown a way by which the error above pointed out may be neutralized. The remedy is a simple one, yet we are not aware that it has been suggested before. It is simply this: to determine in a small portion of the opium "solution" the amount of extractive matter dissolved, and in a larger portion of the same "solution" the morphine. Of course the water originally added to the opium, as well as the fractions removed, must be *weighed*.

In order to show the application of this improvement, let us put down here the main portion of the process of the present U. S. Pharmacopœia, with some alterations of phraseology calculated to insure greater accuracy, and including the new feature.

Take of—

Opium, in any condition to be valued	7 Gm.
Lime, freshly slaked [and in apparently dry powder]	3 "
Ammonium Chloride	3 "
Alcohol,	
Stronger Ether,	
Distilled Water	each a sufficient quantity.

Triturate the opium [previously dried at a temperature not exceeding 85° C. (185° F.), and reduced to powder], lime, and 20 Gm. of distilled water until a uniform mixture results; then add 50 Gm. more of water, and stir occasionally during *one* hour [half an hour is not long enough], taking care that no loss of water be incurred through evaporation. [A good plan is to set the small mortar containing the mixture into a dish containing water, and to cover it with a beaker.] Filter the mixture

through a plaited filter, 3 to 3½ inches in diameter, into a graduated cylinder [keeping the funnel covered with a plate of glass, or beaker, to prevent evaporation].

Transfer 5 Gm. of the filtrate into a tared beaker containing some sand and a glass rod, and evaporate it to complete dryness, occasionally stirring, at 100° C. [This requires only an hour or two, and is long completed before the other part of the filtrate can be put through its last operation.] Note the increase of weight [which may be designated by r (meaning "residue")].

Also transfer about 50 Cc. of the remaining filtrate into a tared Erlenmeyer flask having the capacity of about 120 Cc., and carefully weigh it so as to obtain the exact weight of the filtrate transferred to it (which weight may be designated by S). Add to it 5 Cc. of alcohol and 25 Cc. of stronger ether, and shake the mixture: then add the chloride of ammonium, shake well and frequently during half an hour, and set it aside, well stoppered, for twelve hours. Finally filter as directed by the U. S. Pharmacopœia, wash the morphine and dry it at 100° C. (the weight of the morphine may be designated by m).

The percentage of dry morphine in the opium thus assayed will then be found by the following rule:

Multiply the weight (m) of the morphine thus obtained by 5000, and divide the product by the weight (S) of the solution used for the morphine determination, multiplied by the difference between 5 and the dry residue (r) obtained from 5 Gm. of the solution.

Or, using the letters above inserted, and designating by x the percentage of dry morphine in the opium, the following formula will give the desired result:

$$x = \frac{5000m}{S(5-r)}$$

This formula requires explanation. It can be arrived at in several ways. We shall here choose the most simple, so as to make it plain even to those who are not mathematically disposed.

However, before explaining how this formula is arrived at, we shall go through the process step by step in order to explain the principle upon which the reasoning is based.

Let us assume that we had treated 7 Gm. of a powdered opium as above directed, had filtered off the solution, had evaporated a portion of 5 Gm., and obtained 0.25 Gm. of dry residue, and had obtained from another portion of exactly 50 Gm. 0.680 Gm. of dry morphine.

The 5 Gm. of filtrate, evaporated to dryness, evidently consisted of—

Extractive	0.25	(I.)
Water	4.75	

Now, if 4.75 Gm. of water could dissolve from the opium 0.25 Gm. of soluble matter, then the whole 70 Gm. of water must have dissolved 3.684 Gm. of soluble matter:

$$4.75 : 0.25 = 70 : x \qquad (II.)$$
$$x = 3.684$$

Hence the total weight of the solution must be:

Extractive	3.684 Gm.
Water	70. "
	73.684 Gm.

That is to say, these 73.684 Gm. of solution represent the 7 Gm. of opium.

If we now use, as we assume, exactly 50 Gm. of the solution for the morphine determination, these 50 Gm. will correspond to 4.75 Gm. of the original opium:

$$73.684 : 7 = 50 : x \qquad (III.)$$
$$x = 4.75$$

Assuming next that these 50 Gm. of solution yielded us 0.68 Gm. of dry morphine, then we would calculate the percentage in the opium thus:

opium		morphine		opium		morphine	
4.75	:	0.68	=	100	:	x	(IV.)
		x	=	14.3157%			

Now let us proceed to construct the general formula by starting from the last-given proportion (IV.), which may be written thus:

$$x = \frac{0.68 \times 100}{4.75} \qquad (V.)$$

or, as we adopted the general term m for the morphine obtained by the assay, we substitute this:

$$x = \frac{100m}{4.75} \qquad (VI.)$$

Now, it will be seen from proportion (III.) that the term 4.75 indicates the amount of original opium corresponding to 50 Gm. of the solution. On the other hand, the same term expresses the amount of water contained in 5 Gm. of the solution [according to (I.)], and this correlation will be found always to exist. Hence we may substitute in equation (V.), for the denominator 4.75, the expression $5 - r$:

$$x = \frac{100m}{5-r} \qquad (VII.)$$

This simple equation would be sufficient to calculate the percentage of morphine, if we were to take for each assay *exactly* 50 Gm. of the opium solution; but, as this is inconvenient, and the quantity is first measured and then weighed, we will almost always have a little more or less than 50 Gm. Hence the term

$$\frac{100m}{5-r}$$

will have to be multiplied by a fraction having 50 as numerator, and as denominator the figure expressing the actual weight of the solution in grammes. Supposing we had made four assays, and the weight of solution used for them was respectively:

(a) 50 Gm. (exact), (b) 45 Gm., (c) 48 Gm., (d) 52 Gm.,

then the above-mentioned term would become, for these different values:

$$\text{(a)}\quad \frac{50}{50} \times \frac{100m}{5-r} = \frac{100m}{5-r}$$

$$\text{(b)}\quad \frac{50}{45} \times \frac{100m}{5-r} = \frac{5000m}{45(5-r)}$$

$$\text{(c)}\quad \frac{50}{48} \times \frac{100m}{5-r} = \frac{5000m}{48(5-r)}$$

$$\text{(d)}\quad \frac{50}{52} \times \frac{100m}{5-r} = \frac{5000m}{52(5-r)}$$

The method here detailed involves, it is true, several extra weighings, but, as it provides for the elimination of the chief source of error heretofore connected with this class of assay processes, this can be no objection.

The quantity of lime which the 5 Gm. of opium "solution" evaporated to dryness contains is so minute that it does not need to be considered in the calculation at all.

It is not claimed here that the suggested improvement will render this class of processes absolutely more exact than the first group, in which the opium is completely exhausted. It is only claimed that it will make the analytical results independent from one of the hitherto unknown and variable factors. Regarding this factor it should be stated that several investigators have occupied themselves with the question, what increase of volume a given measure (70 Cc. or 50 Cc.) of water will undergo when it takes up the soluble parts of a given weight of opium. According to Mr. Cripps the increase of volume amounts to about 4 per cent, but according to Messrs. T. J. Wrampelmeier and G. Meinert (see AMERICAN DRUGGIST, 1886, 203) it amounts to only about 0.58 per cent, which latter figure is so small that it might be practically neglected. It is, however, doubtful whether this increase of volume is always so small. There may be substances present in some opiums, perhaps such as have been added purposely as adulterants, which increase the volume of the aqueous solution very materially. At all events, it is impossible to tell beforehand what the increase will be, and therefore it is best to eliminate the uncertain factor.

It is generally conceded that the "fractional" method

of assaying opium—if we may use this term for the second group of processes—never yields as high results as the first group, though it stands nearest to it. In our judgment this is mainly due to the fact that the opium is kept in contact, during the period of maceration, with a partly saturated solution, which renders further solution sluggish and osmosis of the dense solution of extractive from the interior of the minute particles of matter difficult. If more time were given to the maceration, with frequent shaking so as to render the liquid portion homogeneous, the liquid—both that still contained within the particles of solid substance and that outside of them—would no doubt finally contain the same amount of dissolved matter in all its portions. But to wait for this event would probably be as tedious, or perhaps more so, than to use the process involving the complete extraction of the opium by repeatedly treating it with fresh portions of menstruum, by which the soluble parts are much more rapidly extracted, since osmosis from a dense solution inside of the particles to a fresh or but lightly charged menstruum surrounding them is not interfered with.

TABLET PRESS.

THE accompanying illustration represents a press for making compressed tablets, constructed by Rob. Liebau, of Chemnitz, Germany. It is made of metal throughout, and is supplied with two exchangeable sockets and plungers. One of the matrices is introduced into the socket and the other attached to the piston. The mode of compressing powders is the same as that in other similar presses. The price of the apparatus is stated to be 30 marks.—*Zeitsch. des allg. Oest. Ap.-Ver.*, No. 4.

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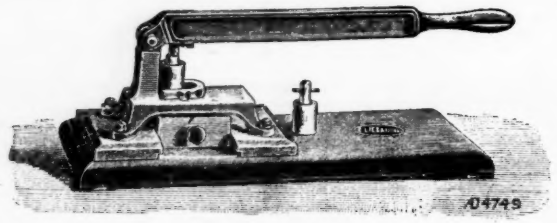


Liebau's Tablet Press.

Pictet's Chloroform.

AT a recent meeting (February 4th) of the Berlin Pharmaceutical Society Dr. Schacht discussed the subject of purification of chloroform, and objected to the statement of Du Bois-Reymond as to the stability of Pictet's chloroform being due to its superior purity. The sample examined by him had a specific gravity of 1.4848, and was assumed to contain 1 per cent of alcohol, added for the purpose of making it keep unchanged. When washed sufficiently to remove the alcohol it suffered the usual decomposition when exposed to light. Schacht is of opinion that this change takes place the more rapidly the purer chloroform is, and that it results from absence of alcohol, not from the presence of foreign substances as DuBois Reymond thinks. In a paper by Dr. E. Biltz, read at the same meeting, a similar opinion was expressed on the basis of comparative trials of ordinary chloroform and that prepared by Pictet's method. Biltz regards the decomposition that takes place under the influence of light and air as natural characteristics of chloroform, and not as a result of the presence of impurities in minute proportions. He also disputes the assumption that in this case crystallization can be an efficient means of purification, and he considers that if the Pictet method be really an improvement in the purification of chloroform, evidence of that must be given by proving the separated impurities to be *hurtful in themselves*, and the prejudicial influence of the amounts present in ordinary chloroform to be such as would render their removal necessary or advantageous. In the discussion on this subject E. Du Bois-Reymond replied more from the medical point of view, as being in his opinion of paramount importance; but the general feeling of the meeting appeared to be in favor of the view that, physically and chemically, there is no sensible difference between the chloroform prepared by Pictet's method and any other kind of well-purified chloroform. The experimental data that have been put forward to prove a difference between the effects of pure chloroform and those of the impurities stated to be present in ordinary chloroform, are not favorably received by medical critics, and the absence of any chemical evidence as to the nature of the impurities alleged to be present in chloroform and separated by Pictet's method leaves much room to doubt the value of that method.—*Pharm. Journ.*

The Purity of Extracts.

AT a recent meeting of the London Chemists' Assistants' Association, Mr. W. Watson Will presented a paper on the "Purity of Extracts," which we insert here after the *British and Colonial Druggist*:

The intention of the paper was chiefly to emphasize the observation made by Mr. S. Rutherford Hill at a meeting of the British Pharmaceutical Conference in Hastings, 1884, which dealt with the presence of copper in extracts.

Among impurities which might be met with in extracts were mentioned dextrin, gum, starch, graphite, the chlorides and carbonates of potassium and of calcium. Among different methods for testing organic impurities, that of Goldschmidt was perhaps the best; it consisted in precipitating with plumbic acetate, but was at best only approximate. During the past six months the author had examined the ash of a number of extracts, and had been struck by the constant presence of copper (sometimes in high proportion), which must have been derived from the vessels used in the process of manufacture.

Copper had long been employed as the material for making evaporating pans. It had been pointed out years before by Mr. Octavius Corder, of Norwich, that tinned copper vessels were preferable. The claims of enamelled vessels had also been advocated, but none of these suggestions had attracted much attention.

In the manufacturing of extracts, one had first to consider all the changes which would be likely to take place during the process of evaporation. If the vegetable juices or decoctions were acid to begin with, it was very questionable whether metal vessels were suitable. Chemical changes took place, due no doubt to the absorption of oxygen, producing organic acids and "humin"; at the same time these changes had no appreciable effect upon the more definite principles of the plants, such as alkaloids. Owing to this alteration the basis of the extract was often quite different from the original soluble constituents of the drug.

Bearing these things in mind, copper should be the last of the metals to be employed for the construction of evaporating pans; silver was too expensive, and iron was unsuitable for many extracts owing to the astringent matter contained in them. Mr. Will wished to advocate the use of nickel vessels, or such as were well enamelled and unaffected by the liquid during evaporation.

In reviewing the extracts of the Pharmacopœia, he had considered them according to a system, dividing them into classes: 1. Green extracts; 2. Alcoholic extracts; 3. Hydro-alcoholic extracts allied to the preceding; and 4. Acid extracts.

The process used for the determination of copper was the colorimetric of Carnelly; the ash from a weighed quantity of extract was treated with strong hydrochloric acid and a little chlorate of potassium until chlorine compounds ceased to be evolved. Then ammonia was added to strong alkalinity, precipitating iron, the whole filtered, the residue washed with water containing a small quantity of free ammonia, and the filtrate boiled to expel excess of the precipitant. If the proportion of copper was very small the solution must be very concentrated. The liquid thus freed from ammonia was placed in a cylinder, ½ Cc. of 4-per-cent potassium ferrocyanide solution added, and the color compared by a Nesslerizing process with that given by a standard solution of copper sulphate (1 Cc. = 1 Mgm.) For very mi-

nute quantities of copper the zinc-platinum process was preferable; by it $\frac{1}{10000}$ Mgm. of copper could be detected.

All the green extracts were found to contain copper, especially belladonna and henbane, which yielded 1.722 and 1.476 per cent respectively, calculated as crystallized cupric sulphate. The other extracts of the same class yielded smaller results.

Among alcoholic extracts, those of cannabis indica, belladonna, and cimicifuga showed traces of copper. Remarkable quantities were found in the liquid extracts of ergot, cinchona, and bael, and traces in others.

The aqueous extracts of gentian, licorice, quassia, and pareira gave evidence of the largest quantities of copper, while that of mezereon (ethereal) also took a high position.

Epitomizing these data, the results must be indicated as follows:

Ext. belladonnæ gave with ferrocyanide " " alc. gave with ferrocyanide " hyoscyamin gave with ferrocyanide " ergotæ liq. gave with ferrocyanide " cannabis ind. gave with ferrocyanide " cinchonæ liq. gave with ferrocyanide " gentianæ gave with ferrocyanide	a deep brown.
Ext. aconiti gave with ferrocyanide " lactucæ " " " conii " " " glycyrrh. " " " quassiæ " " " pareiræ " " " cimicifugæ " " " belæ " " " mezerei æth. gave with ferrocyanide	a light brown.
Ext. anthemid. gave with ferrocyanide " cascaræ liq. " " " taraxaci " " " gelsemii " " " lupuli " "	a faint brown.
Ext. opii " krameriæ	gave evidence of Cu in traces.
Ext. stramonii " rhei " physostig.	were free from Cu.
Ext. ipecac. acet. contained large quantities of the metal.	

From the results the author concluded that copper was of very frequent occurrence in extracts, a fact which did not reflect much credit on the manufacturer or on the dispensing chemist, who ought to prepare his own extracts and thus avoid the impurities introduced by ignorant manipulation.

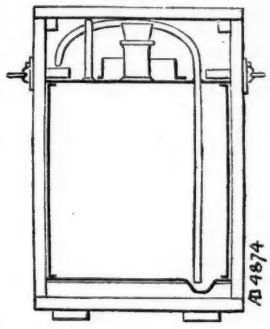
In connection with the above, attention may be called to a paper by F. W. Haussmann which appeared in the *American Journal of Pharmacy* for January, and which also treats of the presence of copper in some galenical preparations. Out of eight different makes of fluid extract tested, only two gave no sign of this metal. Most of the samples by the other makers contained it in greater or less degree. Alcoholic fluid extracts were found to be practically free from copper, about 50 per cent of the solid extracts examined were contaminated with it, whilst powdered extracts for the most part yielded negative results.

Note on Payen's Process for the Detection of Free Mineral Acids in Vinegar.—According to Payen's process, 100 Cc. of the suspected sample are boiled for twenty or thirty minutes with 0.05 Gm. of potato starch. If no mineral acids were present the starch will have been but little acted upon (dissolved), and will consequently show with the iodine test; but the presence of even 2 parts per thousand of sulphuric acid is said to be sufficient to convert all the starch into dextrin or glucose, and even then it will give no true coloration with iodine. This process is almost a standard one, and has scarcely ever been attacked; but F. Corril, a French analytical chemist, has stated recently that he cannot recommend it, as he still obtained the starch reaction with vinegar containing 4 parts of sulphuric acid or 5 parts of either hydrochloric or nitric acid per thousand. Hence vinegar dealers, unless their own experience agrees with Payen's for varying percentages of adulteration, should not rely too implicitly on this test.

VESSEL FOR TRANSPORTING HYDROFLUORIC ACID.

J. L. C. ECKELT transports and stores hydrofluoric acid in leaden vessels having the form and construction shown in the cut.

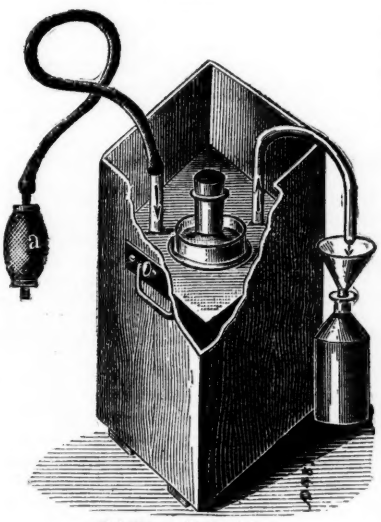
FIG. 1.



The storage vessel is a square leaden box with rounded-off corners, standing in a wooden box deeper than itself. In the centre of the leaden box is a neck closed by a rubber stopper. At one side is a tube through which air may be blown into the vessel by means of the bulb *a*. At the other side is a leaden tube reaching, inside, to the bottom of the tank, through which the acid is drawn off.

When the vessel is to be shipped, the ends of the two projecting lead tubes are brought together and soldered, and the cover nailed on (see Fig. 1). When the box has been opened and the vessel is put in use, pieces of rubber tubing are slipped over the ends of the lead tubes, and secured by pinchcocks.—*Ch. Zeit.* 4374]

FIG. 2.



Eckelt's Acid Container.

Digitaline.

A COMPARATIVE study of the different kinds of digitaline met with in commerce has been carried out by Fouquet, and he arrives at the conclusion that digitalis contains a well-defined active principle, digitaline, which possesses all the properties of the plant. Other substances more or less active may be obtained from digitalis, and they are sometimes sold under the name of digitaline. These may be classed in two distinct groups:

1. Digitaline soluble in chloroform and insoluble in water—crystalline digitaline, amorphous digitaline, digitoxine digitaline.

2. Digitalines insoluble in chloroform and soluble in water—German digitaline, digitalein.

Those of the first group are, when pure, of equal activity. They are the only forms that should be used in medicine, but preference is to be given to the crystalline digitaline. The pharmaceutical form in which digitaline is administered is considered to be of importance. The *use of granules is condemned* as involving uncertainty, and preference is given to a standard solution made with glycerin, alcohol, and water, containing in 1 Cc. 1 Mgm. of digitaline.—*Bull. Therap.*, cxxii., 74, and *Pharm. Journ.*

Lithium Nitride.—By heating lithium in a current of nitrogen gas, Ouvrard (*Comptes Rendus*, cxiv., 120) has obtained a product containing 38 to 56 per cent of nitrogen, and his analysis leads him to conclude that the compound formed may be represented by the formula Li_3N, or ammonia in which the hydrogen is replaced by three atoms of lithium.—*Pharm. Journ.*

CHECK VALVE FOR WATER FILTER PUMPS.

C. HAASE recommends the check valve shown in the accompanying illustration to be interposed between the filter pump and the vessel to be exhausted.

A is a strong piece of glass tubing containing the two rubber stoppers *b* and *c*. The bent glass tube *d* leads to the vessel to be exhausted. It is not pushed in to the end of the stopper, there being enough of the bore left bare to engage the round bulb of the inside glass tube when it is driven forward by water. The tube *e* leads to the filter pump; *f* is a rubber ring having three pieces cut out at

equal distances, as shown in the smaller cut. The object of these gaps is to permit the air to pass in the direction of the arrow. Should, by some accident, water find its way into the tube *e*, the interior float serving as a check would be instantly pushed back, and the tube *d* thereby become closed.—*Chem. Zeit.* 4748]

A NEW BURETTE FLOAT.

PROF. RUDOLPH BENEDIKT has devised a new burette float, in which the circular mark is not engraved or enamelled on the outside, but is attached to a piece of glass tubing on the inside of the float. The object of this is to retain the mark permanently, since it is apt to be either corroded or gradually effaced when it is on the outside.—*Chem. Zeit.*, No. 14. 4973]

The Constituents of Castor Oil.

CASTOR OIL has been the subject of many investigations, but no definite conclusion has yet been arrived at regarding the active principle. The most striking point about it is that, when applied to the skin or mucous membrane, castor oil, unlike croton oil, is a perfectly bland, unirritating substance, but when swallowed it causes sufficient irritation to enable it to act as a moderately powerful purgative. Schmiedeberg, Dixson, and others hold that it contains a special acid principle which is the purgative body, while Buchheim long ago stated that there is no special substance, the purgative action depending on the ricinoleic acid which is set free by the oil undergoing partial saponification by the alkalies of the small intestine. The latter is the current view, and has been recently strongly supported by Hans Meyer (*Archiv f. Exp. Path. and Pharmak.*, xxviii., 1890). Meyer prepared ricinoleic acid by saponification of the oil with soda, precipitation with calcium chloride, and crystallization of the calcium salt from alcohol. The ricinoleic acid was set free by the addition of hydrochloric acid and further purified. The glyceride was also prepared synthetically by heating together glycerin and ricinoleic acid to 330° C. in a stream of carbonic anhydride. Both the glyceride and the ricinoleic acid were found to be purgative to cats and to men, but in men the action was accompanied by more nausea and colicky pains than is usual with castor oil.

As the oil has been heated to 300° C. in an atmosphere of carbonic anhydride without losing its purgative action, it occurred to one of us that it might be possible to decompose the oil with superheated steam at the temperature of 300° C., and so obtain the purgative principle in a more concentrated form and free from nauseous taste. The oil was decomposed by superheated steam in the laboratory of Messrs. Duncan, Flockhart & Co., and the product used for physiological experiment.

The glycerin in ½-ounce dose had not the slightest action on a dog, to which it was given by the mouth.

Of the ricinoleic acid, 3 drachms given to a dog had no purgative action, and 6 drachms given subsequently remained without effect. The latter amount also proved inoperative in rabbits.

In connection with his castor-oil research, Meyer states that dogs and rabbits are very uncertain in their reaction to purgatives, and that cats are much more reliable subjects for experiment. Although we do not agree with this statement, we made two trials of our ricinoleic acid on these animals. One cat received 3 Gm., the other 10 Gm., and in neither case was there purgation, although the latter evidently had considerable gastric irritation. As Meyer found that cats were purged by any dose of castor oil over 2 Gm., and that ½ Gm. or more of his ricinoleic acid was also quite active, while 15 Gm. sufficed to purge a dog very thoroughly, it is evident that his ricinoleic acid and ours are substances which differ in important respects.

The residue remaining in the still after the saponification by superheated steam was tested in the same way and found to be devoid of purgative action.—D. B. DOTT (paper read at a meeting of the Pharm. Soc.); *Pharm. Journ.*, March 5th.

Preparation of Pure Strontium Salts.

SINCE strontium salts have recently been introduced into medicine, and the commercial salts are usually quite impure, it will be of interest to note the method of purification recently recommended by Barthe and Falières (in *Bull. de la Soc. Chim.*, 1892 [3d ser.], 7, 104).

The main question involved was the separation of calcium, barium, and strontium. The products obtained by the authors were examined both chemically and spectroscopically. Without quoting the unsuccessful methods, we give at once an abstract of that finally adopted as the best.

Native strontium carbonate or strontium sulphide obtained by reduction of the sulphate is dissolved in a small amount of diluted hydrochloric acid (1 in 5). It is best to leave a little of the carbonate or sulphide undissolved. The clear liquid, which contains strontium, calcium, barium, magnesium, aluminum, iron, etc., is then decanted off and mixed with an excess of ammonia, which precipitates alumina and iron. The mixture is filtered, and the filtrate treated with an excess of sulphuric acid, which precipitates the calcium, barium, and strontium as sulphates. The precipitate is first washed by frequent decantation with common water containing 1 or 2 per cent of sulphuric acid. Finally distilled water is used in the washing. This treatment removes traces of magnesium and all calcium sulphate. The precipitate is then treated in the cold with an excess of 10-per-cent solution of ammonium or potassium carbonate, the mixture frequently stirred during two days, and the precipitate repeatedly washed by decantation with distilled water. The residuary mixture, consisting of sulphate and carbonate, is treated with dilute hydrochloric acid, which dissolves the strontium carbonate and traces of barium. The clear liquid is now decanted, allowed to stand at least twenty-four hours, filtered through paper previously extracted with hydrochloric acid, and the perfectly clear solution then mixed with hydrochloric acid of specific gravity 1.170, 200 Gm. for every litre. Next, 2 to 3 Gm. of precipitated strontium sulphate (which need not be free from barium sulphate) are added and the whole stirred during several hours. The strongly acid liquid dissolves a little of the strontium sulphate (2.5 parts in about 1,000). But in proportion as the strontium sulphate dissolves, barium seizes upon the sulphuric acid, producing a corresponding quantity of chloride of strontium. And since the dissolved sulphate of strontium is always greater in amount than the barium salt, the latter finally disappears entirely from the solution. The liquid is next filtered, evaporated to dryness, the residue dissolved in three times its weight of distilled water, the solution allowed to stand twenty-four hours, again filtered, and then evaporated to the point of crystallization. The resulting product shows only the strontium lines in the spectrum.

Exodyne.—According to Dr. F. Goldmann (*Pharm. Zeit.*, 1892, No. 5), this proprietary substance is composed of a mixture of about 90 per cent acetanilide, 5 per cent sodium salicylate, and 5 per cent sodium bicarbonate.

Syrup of Senna.

PROF. CHARLES CASPARI, JR. (in *Pharm. Review*, 1892, page 49), points out the faulty features of the official formula for syrup of senna, which results in producing an aqueous solution of the soluble constituents of senna, overloaded with gummy matter, and so dense that subsequent filtration is rendered very difficult. He proposes the following improved process:

Upon 33 troyounces of senna leaves pour 24 pints of boiling water, cover well and let stand for six hours, express, and upon the residue pour again 12 pints of boiling water. Cover well and macerate for three hours. Now express once more, and evaporate the mixed liquids at 140° F. on a water bath to 40 fluidounces. When cold, add 10 fluidounces of alcohol, mix well, and set aside, covered, over night; filter out the precipitated gummy matter, washing the filter with a mixture of alcohol and water in proper proportions, if necessary, and evaporate the filtrate to 40 troyounces. Add, when cold, 4 troyounces of alcohol in which 20 gr. of oil of coriander have previously been dissolved, and finally add 56 troyounces of sugar, the solution of which may be facilitated by placing the well-corked bottle in warm water and shaking frequently. The syrup of senna, as thus prepared, is of very dark color, of a pleasantly aromatic odor and taste, keeps admirably well, and possesses the active virtue of the drug in a marked degree. It may be urged by some that the time necessary for evaporating the strained liquids to 40 fluidounces is injurious, but such is not the case if the proper temperature be observed, and, moreover, two or three dishes can be used at one time.

The Method of Disinfection used by the Sanitary Authorities of Paris.

ATTACHED to the sanitary department of Paris there are a number of disinfecting stations, in which clothing, bedding, furniture, and any other article of household implement is disinfected, either by order of the authorities or at the demand of private individuals or corporations. Connected with these stations are also wagons carrying all necessary implements to perform the operation of disinfection in private houses.

In the disinfecting stations the main process consists in exposing the substances first to the action of superheated steam, and afterwards spraying them with a solution of corrosive sublimate, 1 in 1,000, to which are added tartaric acid in the proportion of 75 gr. to the quart, and a few drops of an alcoholic solution of tincture of carmine or indigo. The steam apparatus used is that of Geneste & Herscher, which is now employed by the Government and a large number of cities and public administrations, both French and foreign. After fifteen minutes of steam heating and fifteen minutes of drying, the disinfection is complete.

As for the vaporizers (for spraying), which are constructed by the same house, they are designed to project the antiseptic liquid in a very fine spray over all objects that cannot be placed in the stove, such as leather, furs, etc., and also to disinfect rooms and their contents. With the solution mentioned above this mode of disinfection is done rapidly, without any injury even to objects of high price, provided the operation be performed with some care. The perfect efficiency of this process has been many times demonstrated. It is destined to replace disinfection through sulphurous acid gas, which is a difficult, always incomplete and illusory process in the conditions of current practice, and so lengthy as to render the use of it much more injurious than useful as regards the generalization of disinfection.

The municipal disinfecting stations of Paris are open to the public gratuitously, either when one carries the contaminated objects thither directly, or requests the employees to come to the house for the objects, and, what is indispensable, to disinfect the house at the same time. The service is performed by special men whose experience has been tested, and it is supervised with much care by Menaut, the director of municipal affairs.

When the wagon starts the disinfectors must be sure that it contains the following material: (1) the vaporizer pump and several bottles containing the disinfecting liquid, which are confided to their care and responsibility, and must never be entrusted to any one else, no matter who it may be; (2) a bottle containing a quart of solution of permanganate of potash in the proportion of 12 gr. to 1,000; (3) a canvas bag containing the working costume—say, for each man, a canvas cap, a pair of canvas trousers, a canvas blouse adjusted to the neck and wrists, and shoes; (4) several wrappers, closed in any way except by leather cords, and which must be of different forms for mattresses, bolsters, pillows, coverlets, etc., and must be marked with numbers or letters in red, of large size; (5) rags, designed for wiping purposes; (6) two large sponges, a scrub brush, and a brush with a handle; (7) a tool bag; and (8) a jointed ladder, provided with rubber at the extremities of the uprights.

As soon as they reach the house the disinfectors carry their material to the room to be disinfected, and put on their working clothes before entering it. They first, with a brush, scour the linen spotted with blood, with the aid of the permanganate solution, after which they put into wrappers all the objects that are to be carried to the stove, such as mattresses, bedclothes, linen, curtains, clothing, etc. Then, after pouring the contents of one of the bottles into the vaporizer pump, and after filling the latter with water, they project a spray of disinfecting liquid against the walls, floors, woodwork, carpets, furniture (especially the beds), night tables, and all the other objects left in the room.

No portion of the rooms to be disinfected, nor any of the objects that they contain, must be neglected.

The mirrors and their frames, the pictures and art objects, have to be rubbed with rags that have been dipped in the disinfecting solution. The carpets and the hangings left in the house on account of their bulk have to be removed and treated on both sides with a spray of the disinfecting fluid. The floor or the walls that they cover have likewise to be disinfected. The vessels and utensils that have been used by the patient, as well as the water closets and toilet tables, have to be washed with the disinfecting solution. After these operations are finished the disinfectors must take off their working clothes, and put them in the bag provided for them, and take them to the disinfecting stove along with the bags containing the objects that are likewise to be placed in the stove. As soon as the objects to be disinfected reach the establishment they are unloaded, and the whole must, as soon as possible, be disinfected. After disinfection the objects are carried back as soon as possible to the house of their owner by the wagon especially designed for the purpose.

Such is the programme followed in great part by the disinfecting service of the municipal station. All the details of this programme have their importance, and it is because they can be carefully executed by such service that the latter is the only one that is now capable of inspiring confidence in the citizens of Paris.—*La Nature* and *Scient. Am. Suppl.*

The Purification of Resinified Essential Oils.

OLD ethereal oils differ from fresh ones mainly in two points—first, that the terpenes contained in the former are partly polymerized and resinified in the course of time in consequence of exposure to light, air, and moisture; and, second, that the esters and aldehydes existing therein have undergone a partial saponification or oxidation whereby they have become acid.

Dr. H. Werner gives the following method (in *Pharm. Zeit.*, No. 5, 1892) for their purification. The editor of the paper points out that this is not equivalent to a complete restoration, since this implies the reconstruction of the oil so as to contain the same percentage of every constituent, which is impossible. Nevertheless the "purified" oils will be useful for many purposes.

The first step is to neutralize the oils with a trace of soda. Next they are distilled with steam. A good arrangement is the following: The oil is placed into a short-necked, round-bottomed flask connected with a Liebig's condenser. From an ordinary tin can, filled with water and heated by a flame, steam is generated and conducted by a bent glass tube to the bottom of the flask containing the essential oil. The oil will gradually become heated by the passing steam and will be carried over with the vapor. The distillate consists of oil and water, the latter

of which may be utilized by itself, if there is any use for it. The oil thus obtained ought to be once more rectified, if a perfectly satisfactory product is desired. For this purpose it should first be entirely deprived of water by being dried over a caustic alkali, such as caustic potassa. This is best done by introducing the oil into a bottle, adding some sticks of the alkali, then heating to 50° to 60° C., and allowing the flask to stand over night. The oil is then distilled from a flask with a delivery tube fused to it, over a naked fire. The vapors need not be cooled. To prevent bumping a little talcum is added to the oil.

When only small quantities are to be purified, it is sufficient to treat the oil with an alkali and then to distil. The flask will then retain all the sticky resin. When larger quantities are to be treated, the presence of the resin would be very objectionable and greatly interfere with the distillation.

Color Reactions for Alkaloids.

In the second part of the third volume of his "Commercial Organic Analysis," which is now in the press, Mr. A. H. Allen has an interesting chapter on this subject, which has been published in advance by the *Chemist and Druggist*, from which we reprint it here.

After summarizing the groups into which the color reagents may be classed, Mr. Allen proceeds to say that the best method of observing the color reaction of an alkaloid is to apply a drop of the reagent, by means of a pipette or glass rod, to a minute fragment of the solid alkaloid placed on a porcelain plate or in a flat porcelain dish. An alkaloidal residue obtained by the evaporation in a porcelain capsule of an alcoholic, ethereal, chloroformic, or other solution may be very conveniently employed for observing color reactions.

The following synopsis of the color reactions of the alkaloids is then given, the author cautioning his readers that the statements are compiled from various sources and that different observers have in some cases obtained very discordant results:

Concentrated Hydrochloric Acid gives color reactions with a few alkaloids. Thus *reddish* colors are yielded with physostigmine, sabadilline, sabatrine, veratrine and veratroidine, and a *yellow* with thebaine. On addition of chlorine water after hydrochloric acid, berberine gives a *red* color. Nicotine yields an amorphous hydrochloride, and coniine a crystalline salt on evaporating the solution in hydrochloric acid.

Concentrated Sulphuric Acid gives color reactions with a number of alkaloids, the colorations varying with the degree of heat applied. The following reactions have been observed when the acid is dropped on the solid alkaloid without applying heat: *No color*, or a faint straw tint only, is yielded by pure aconitine, caffeine, chelidonine, cinchonidine, cocaine, codeine, hyoscyamine, gelsemine, morphine (purple to brown on warming), nicotine, pilocarpine, quinine, quinidine, staphisagrine, and theobromine. *Yellowish* colorations are given by colchicine, gnoscopine, jervine, and by many other alkaloids in presence of impurities. *Reddish* colors are produced, either immediately or gradually, with impure aconitine, apomorphine, brucine (pale rose), cocaine (impure), coniine (pale red), gelsemine (impure), meconidine, narceine (changing to black), narcotine (yellowish red, changing to violet and blue), physostigmine, rhoeadine, sabadilline, sabatrine, solanine, taxine, thebaine, veratrine and veratroidine. *Bluish* colorations are yielded by cryptopine, curarine (after a time), and papaverine. *Greenish* colors are given by bebeerine, berberine, emetine (brownish to green), piperine, and sometimes by rhoeadine.

Some characteristic changes of color can be obtained by gradually warming the capsule in which the test is being made, by placing it over a small beaker of boiling water. The ultimate result is usually browning and charring of the alkaloid, but the intermediate reactions are often of value.

Many substances besides alkaloids give more or less brilliant color reactions with strong sulphuric acid. Thus *red* colorations (often of a brilliant hue) are obtained with amygdalin, columbin, elaterin, hesperidin, phloridzin, populin, salicin, sarsaparillin, senegin, smilacin, syringin, and many varieties of tannin.

In applying sulphuric acid as a color test for alkaloids, it must be remembered that the presence of a very minute quantity of nitric acid, often present as an impurity, greatly modifies the colorations produced by many of the alkaloids. Thus, if the treatment with sulphuric acid (without applying heat) be followed by the addition of a minute quantity of nitric acid (at the end of a glass drawn out to a point) or a minute fragment of solid potassium nitrate, the following reactions will be obtained: *No color* with atropine, caffeine, cinchonidine, cinchonine, nicotine, pilocarpine, quinidine, staphisagrine, strychnine, or theobromine. *Red* coloration with brucine, curarine, narcotine (reddish violet or blood red), physostigmine, sabadilline, thebaine, and veratrine (gradually change to cherry-red).

Erdmann applies this test by mixing 6 drops of nitric acid of 1.250 specific gravity with 100 Cc. of water, and adding 10 drops of the dilute acid so obtained to 20 Gm. of sulphuric acid. From 8 to 10 drops of the reagent so prepared ("Erdmann's Reagent") should be added to 1 or 2 Mgm. of the solid to be tested, and the color observed after 20 or 30 minutes.

Strong Nitric Acid of 1.400 to 1.420 specific gravity gives more or less characteristic color reactions with a number of alkaloids. A drop of the acid should be applied by means of a glass rod to a minute fragment of the alkaloid, or to a residue left on evaporating a solution on white porcelain. *No coloration* is yielded by aconitine (when pure), atropine, caffeine, cinchonidine, cinchonine, gelsemine (impure, greenish), quinidine, quinine, strychnine, or theobromine. *Yellowish* colors are obtained with impure aconitine (color varies from yellow to red and brown), codeine (orange yellow), morphine (yellow to red), narceine, narcotine, papaverine (orange), rhoeadine, sabadilline (yellow), thebaine, and veratrine. *Red* shades are produced by impure aconitine (color varies from yellow to red and brown), apomorphine, bebeerine (red to red brown), berberine (red brown), brucine (blood-red), papaverine (orange-red), pseudomorphine (orange-red), and physostigmine (gradually). Gelsemine yields a deep *bluish green* residue on evaporation. *Blue colors* are said to be given by colchicine and solanine and by the glucosides ligustrin and syringin.

Sulphomolybdic Acid (*Fröhde's Reagent*) affords one of the most useful of the oxidation tests for alkaloids; but it must be borne in mind that the colors produced are in a great measure those of the lower oxides of molybdenum, and that various other bodies besides alkaloids readily reduce molybdic acid with formation of these colored oxides. The reagent itself, if strongly heated, acquires a blue coloration from reduction of the molybdic acid. Fröhde's reagent is prepared by dissolving 3 Mgm. of molybdic acid or molybdate of ammonium in 1 Cc. of strong sulphuric acid. *No color* is produced with atropine, caffeine, cinchonidine, cinchonine, coniine, delphinine, hyoscine, hyoscyamine, nicotine, strychnine, or theobromine. *Yellowish* colorations are given by aconitine, colchicine, and piperine. *Reddish* shades of color are produced by brucine, emetine (red changing to green), narceine (red changing to blue), sabadilline (reddish violet), solanine, thebaine (orange), and veratrine (gradual production of a cherry-red color). *Bluish* colors are given by codeine (gradual production of deep blue), morphine (violet-blue, then dirty green, changing to deep blue), narceine (yellowish-brown, changing to red and blue), staphisagrine (violet-brown). *Greenish* colorations are produced by apomorphine (green to violet), bebeerine (brown-green), berberine (brown-green), emetine (red, changing to green, and turned blue by hydrochloric acid), quinine (pale green), and quinidine (pale green).

Of non-alkaloid bodies, colocynthin gives slowly a cherry-red color; elaterin a yellow; phloridzin, gradually blue; populin, violet; salicin, violet to cherry-red; and syringin, a blood-red to violet red coloration.

Sulphovanadic Acid has been recommended by F. Kundrát (*Chem. Zeit.*, xiii., 265; *Journ. Soc. Chem. Ind.*, viii., 421) as a color test for alkaloids. The reagent is

prepared by dissolving 0.1 Gm. of ammonium vanadate in 10 Cc. of strong sulphuric acid. It is stated to give the following reactions, many of which are due to the production of the colored lower oxides of vanadium, and hence are likely to vary with the proportions of the reagent and alkaloid employed. *No coloration* is produced by caffeine or nicotine. *Brown* by aconitine (light coffee-brown), codeine (greenish-brown, becoming darker), morphine, narceine (changing to dirty bluish-violet, then gradually reddish-brown), piperine (intense reddish-brown to black), kairine (dirty pink, quickly changing to dirty light-brown and brownish-green), solanine (coffee-brown, changing at the edge to purple and in the centre to dirty green, and very gradually becoming an intense violet jelly). *Red* colorations are given by atropine (changing to yellowish-red and yellow), brucine (intense blood-red, gradually fading), narcotine (blood-red or purple), and veratrine (brownish-red, changing to reddish-violet). *Yellowish* or orange colors are produced by cinchonine (changing to green), cocaine (orange, froths on dissolving), physostigmine (greenish-yellow, then purple, finally yellowish-brown), and quinine (changing to bluish-green and greenish-brown). *Green* colorations are produced by colchicine (changing to greenish-brown and coffee-brown), coniine (intense green, changing to brown), and quinidine (faint bluish-green). *Blue* reactions are produced by antipyrine (greenish-blue, gradually becoming bluer) and apomorphine (dark violet-blue, rapidly changing through dirty green to reddish and light-brown). *Violet* colorations are given by papaverine (gradually changing to bluish-green and orange-green) and strychnine (bluish-violet, changing to reddish-violet, purple, and brilliant red).

Of colorations with non-basic principles the following have been recorded: antifebrin (acetanilide), purple rapidly changing to brown; digitalin, intense brown with reddish shade; and salicylic acid, brownish-green. Picrotoxin and santonin give no coloration with sulphovanadic acid.

Ferric chloride gives a few characteristic colorations, the most important being the blue reaction with morphine and the blood-red with antipyrine. A freshly made mixture of *ferric chloride* and *potassium ferricyanide* (free from ferrocyanide), both in aqueous solution, has a yellowish-brown color, but in presence of certain alkaloids it is immediately colored blue (or green), owing to the production of Prussian blue. This reaction was at first regarded as characteristic of the ptomaïnes or cadaveric bases; but it is produced by any readily oxidizable alkaloid, and hence is given immediately by morphine, cocaine, aconitine, physostigmine, etc., and after a short time by hyoscyamine, emetine, colchicine, nicotine, and many of the tar bases.

Oxidation color reactions are also produced by reagents having a more powerful oxidizing action than the foregoing. Thus strong sulphuric acid may be employed in conjunction with potassium nitrate, chlorate, perchlorate, permanganate, bichromate, and ferricyanide, or with metallic peroxides, such as those of manganese, lead, ruthenium, uranium, and cerium. The most important of the color reactions obtained with such reagents are those yielded by strychnine, curarine, gelsemine, and aniline.

Substitute for Mucilage of Acacia.—The following mixture was recommended by Mr. H. D. Sykes, at the last meeting of the Wisconsin Pharmaceutical Association, as a substitute for mucilage of acacia for technical purposes:

Dextrin, white	6 ounces.
Acetic Acid, dilute	1 ounce.
Oil of Cloves	10 drops.
Glycerin	1 ounce.
Water	to make 16 ounces.

Mix the dextrin thoroughly with 6 ounces of cold water, add 8 ounces of boiling water, boil five minutes, stirring constantly; add hot water sufficient to make 14 ounces. When it is cold, add the acetic acid, oil of cloves, and glycerin. The oil must be thoroughly mixed with the remainder.

Purified Kola.—A chocolate manufacturer of Berlin has patented a process by which the bitter principle of the kola nut is completely removed, so that it may be employed in admixture with cacao in the preparation of chocolate. The purified kola is also proposed to be used for the preparation of kola wine, kola pastils, etc.

Niemeyer's Pills.—There are three forms of these pills: (1) *Dropsy Pills.* Each pill contains 1 gr. each of powdered digitalis, blue mass, and powdered squills. (2) *Phthisis Pills.* Each pill contains ¼ of a grain of powdered opium, and 1 gr. each of powdered digitalis and quinine sulphate. (3) *Anæmia Pills.* Each pill contains 2 gr. each of potassium carbonate and exsiccated sulphate of iron, and differs but little from the familiar Blaud's pills, being slightly weaker in strength.—*P. C. P. Alumni Reporter.*

Boric Acid a Germicide.—Peligot observed that bean plants were quickly killed when watered with a solution of boric acid (*Comptes Rendus*, lxxxiii., 686), and further experiments by Morel have led him to the conclusion that boric-acid solution retards, and even puts a stop to, the germination of seeds if the solution be sufficiently strong and the contact with it prolonged. Solution of borax acts in the same manner. It is therefore probable that boric acid would be useful in preventing mildew in the vine, ergot in corn, and other cryptogamic diseases of plants. —*Comptes Rendus*, cxiv., 131, and *Pharm. Journ.*

The Preparation of Lacmoid.—M. Schaerger (*Schweiz. Woch. f. Pharm.*) causes sodium nitrite, without the addition of water, to act upon resorcin at a temperature not exceeding 110°. The product is dissolved in a little water, and freed from undecomposed resorcin by agitation with ether.

Lacmoid forms a clear solution in water and dilute alcohol in any proportion. If the aqueous solution is mixed with acid, the red coloring matter which results can be removed by agitation with ether. This character distinguishes lacmoid from the tincture of litmus.—After *Chem. News.*

A New Departure in Filtering Apparatus.—E. Martin has recently devised the following improvement in filtering apparatus. An endless travelling band, made of any material suitable for filtering purposes, is so arranged as to assume for a portion of its length the form of an open horizontal shallow trough or cistern. For this purpose the band is mounted in a manner to cause it to make a slight descent at one end, and simultaneously to have the two sides or edges of the fabric turned up. In this form the band extends horizontally for a certain length, and is them made to rise again on an incline and to spread out flat. In this manner a shallow travelling cistern is formed between the two inclines wherein the water for filtering is received. The speed of the travelling band may be regulated in such a way as to allow it to be coated to any desired degree with the matter arrested from the filtered liquid, and on continuing to travel it may be conducted through cleansing apparatus, whence it will return cleaned and ready for the renewal of the operation.

To prevent "Bumping" in Boiling Liquids.—"Bumping" is a well-known trouble, and often presents serious inconvenience when liquids like syrups, etc., of high boiling point, and therefore of very high temperature when boiling, are inclined to spurt. Many devices have been proposed, but the most recent is one due to Dr. Pieszczek, who gives it in the *Chemiker Zeitung*, 1891, p. 1126. A piece of glass tubing, 5 to 8 Cm. (2 to 3 inches) long and 5 to 10 Mm. ($\frac{3}{16}$ to $\frac{8}{8}$ inch) diameter, is closed at one end, and into this end a piece of platinum wire is fixed; the wire should be of sufficient length to extend above the liquid; the open end of the tube is to be placed down in the liquid. During the boiling the air in the tube is displaced, and on cooling the tube fills with liquid. Before each operation the tube must be freed from liquid, so that it is full of air when introduced into the liquid that is to be boiled or distilled. This device answers admirably in the distillation of volatile liquids, as we can state from our own experience, having recently tried it; it also assists the steady boiling of other liquids.

American Druggist

AN ILLUSTRATED BI-WEEKLY JOURNAL.

VOL. XXI., No. 7. WHOLE No. 229.

WILLIAM WOOD & COMPANY,
PUBLISHERS,
43 TO 47 EAST TENTH STREET,
NEW YORK, N. Y.

SUBSCRIPTION PRICE per year, - - - - - - - $1.50
SINGLE COPIES, - - - - - - - - - - .10

Address all communications relating to the AMERICAN DRUGGIST *to* WILLIAM WOOD & CO., *43 to 47 East Tenth Street, New York City, to whose order all postal money orders and checks should be made payable.*

The AMERICAN DRUGGIST *is issued on the 1st and 15th of each month. Changes of advertisements should be received before the 5th and 20th. New advertisements can occasionally be inserted after the 10th and 25th.*

EDITORIAL.

SILLY LEGISLATION.

A BILL was recently introduced in the New York Legislature which is ostensibly aimed at the morphine, cocaine, and chloral habit, but which is so dubiously worded, and so mischievous in its tendency, that it should be opposed with the utmost energy. Here is a copy of the bill:

An Act to regulate the sale of Opium in any form, Cocaine or Chloral. The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. It shall hereafter be unlawful for any person living, or doing business in this State, to sell opium in any form, cocaine or chloral, to any person, except a physician or dealer in drugs and medicines, without a written prescription from a licensed physician (who is a resident of this State) issued within forty-eight hours of the date of sale.

SEC. 2. Any person residing in this State, or doing business therein, who shall sell opium in any form, cocaine or chloral, contrary to or in violation of the provisions of this act, shall be deemed guilty of a misdemeanor, and shall be punishable by a fine of not less than two hundred nor more than five hundred dollars for each and every offence.

SEC. 3. Every physician residing in this State who gives a prescription for opium in any form, cocaine or chloral, shall keep a record of the same in a book kept for that purpose, giving the name of the patient and the date of each prescription.

SEC. 4. Any physician residing in this State who, in prescribing opium in any form, cocaine or chloral, shall not conform to, and comply with the provisions of section three of this act, shall be deemed guilty of a misdemeanor, and shall be punishable by a fine of not less than one hundred, and not more than two hundred dollars, for each and every offence.

SEC. 5. This act shall take effect immediately.

In section 1, it is doubtful whether the words "except a physician or dealer in drugs and medicines" refer to the adjective "unlawful" or to the verb "sell." In other words, the sense of the section may be either that "it shall be unlawful for any person, except for a physician or dealer in drugs and medicines, living, etc., in this State, to sell opium, etc., to any person, etc.," or, that "it shall be unlawful for any person, etc., to sell opium, etc., except *to* a physician or dealer in drugs or medicines." Either version would give a sense—such as it is.

Assuming that the second of these versions is the correct one, according to which the only parties to whom the above-mentioned drugs are allowed to be sold without a prescription are physicians and dealers in drugs or medicines, we would like to know how are public or private hospitals, insane asylums, almshouses, dispensaries, etc., to obtain their supplies? Must these institutions obtain each dose of the three remedies on a physician's prescription, to be put up outside, and shall they no longer be permitted to procure the articles in bulk, to be dispensed on the premises by expert pharmacists? Certainly these institutions cannot be included either under "physicians" or under "dealers in drugs and medicines." Or, if one of these institutions should, for instance, want to purchase at one time, say, 50 pounds of chloral hydrate, is it intended that a licensed physician shall write a prescription for this amount?

Let us next examine the words "*opium in any form, cocaine or chloral.*" "Opium in any form" certainly can mean only those preparations in which *all* the constituents of opium, or at least all that are soluble, are present; for instance, opium in lump or in powder, tincture of opium (laudanum), paregoric, wine of opium, vinegar of opium, Dover's powder, any mixture containing laudanum (such as many of the popular diarrhœa mixtures), etc., etc. But the term cannot include *morphine* or its salts, since morphine is *not a form* of opium, but only one of its many constituents. Neither is sugar a form of sugar cane. The proposed law tries to be very explicit about opium preparations, but fails to hit the mark, not only in this case, but also in that of cocaine and chloral. "Cocaine" is the uncombined, almost insoluble alkaloid, and is scarcely ever used. *Hydrochlorate of cocaine* is a different thing, and is the salt universally employed. This may have been intended by the author of the bill, but it is certainly not covered by it. "Chloral" is likewise a substance rarely seen by any but a chemist or manufacturer of chemicals. *Hydrate of chloral*, the substance in universal use, is a different thing. Thus it will be seen that morphine and its salts, hydrochlorate of cocaine, and hydrate of chloral, against which the bill is mainly intended, are not affected by it at all.

The next absurdity is the embargo laid upon all persons "living or doing business in this State," while there is nothing to prevent any one from purchasing the prohibited articles outside of the State and bringing them in himself or having them sent to him. We venture to say that our pharmaceutical friends in Jersey City and other contiguous towns would reap a rich harvest by the operations of the act. It would be the height of silliness to attempt to control the imports into the State, even if it could be done under the Constitution. The only effect the law would have would be to drive business into another State and to make it hazardous for any one within this State to be sick or ailing without having a licensed physician to attend and prescribe for him.

The law also makes it incumbent upon every physician residing in this State (who, by the way, must be licensed, according to section 1) to keep a record of every prescription for "opium in any form, cocaine or chloral"

in a book kept for that purpose, giving the name of the patient and the date of each prescription. What will be the consequence? Rather than keep such a book, the physician will dispense those medicines himself, apparently without charge, rendering his bill only for professional advice.

We have seldom seen a more stupid draft of a law than the one before us. It is only on a par with the sporadic attempts made by would-be legislators to hasten the advent of the millennium, such as the bill recently introduced by Senator W. A. Peffer, of Kansas, in the U. S. Senate, which provides for the financial bleeding of every person worth more than one million of dollars, and practically provides a salary and pension for every man, woman, and child in these United States.

It is quite proper for any State to regulate the practice of medicine by law—that is, to authorize only those to practise medicine who have been found competent by the tests prescribed by the State. But to attempt to prevent the dispensing (selling) of the drugs named on the prescription of a legitimate physician not then *residing* in this State, is absurd. He may have been licensed to practise in the State, and have temporarily or permanently removed. He may be attached to the army or navy, and not be a resident of the State at all. He may be a foreign physician on a visit or accompanying a patient. Should all these be deprived of the right of prescribing the drugs mentioned, even if they want them for their own use?

University of Buffalo, College of Pharmacy.—The mid-course examinations have recently been held, and following them was a week's vacation, the good effect of which is to be seen in the renewed vigor of the students.

The division of the college year into halves not only affords a breathing spell, but the result of the examinations is useful in showing each student his particular strong and weak points long before the examinations for promotion.

Dr. Ernest Wendle, professor of microscopy, is the first appointee under Buffalo's new charter to the office of Health Commissioner for a term of five years. At the civil service examination of applicants for the position of inspector of foods and drugs, Dr. John R. Gray, professor of pharmacognosy, was placed on the eligible list.

The Department of Pharmacy of the Detroit College of Medicine had its twenty-third annual commencement on the 22d of March, and degrees of Ph.G. were awarded to Augustus Currier, Martin A. Dittling, Charles T. Gustin, Frank S. Geppert, George C. Hupp, Fred. J. Rothacher, Merle Smith, and William J. Wayar. Gen'l L. S. Trowbridge and Dr. C. G. Jennings made the customary addresses.

The Alumni of the St. Louis College of Pharmacy have elected the following as officers of their association: President, G. H. J. Andreas; first vice-president, Wm. C. Waldeck; second vice-president, Theo. F. Hagenow; recording secretary, Dr. J. C. Falk; corresponding secretary, Chas. A. Lips; treasurer, Chas. Gietner; registrar, O. F. Heitmeyer. Members of the executive board, Professor Francis Hemm, Thos. A. Buckland, and Theo. Ilg.

The Florida State Board of Pharmacy will convene in St. Augustine on the 12th of April for the examination of candidates for registration. The secretary, Mr. Ed. Delonest, of Ocala, will supply blank forms for application and any information respecting details.

The Chicago College of Pharmacy.—At an annual meeting of the college held March 15th, W. K. Forsyth was re-elected to the presidency, C. L. Feldkamp and Paul J. Behrens as trustees to serve for five years, and Herman Fry to serve as trustee for one year.

Arrangements were made to hold the final examinations on the 11th, 12th, 13th, and 14th of April, and the graduation exercises on the 19th at Hooley's Theatre.

NEWS AND NOTES.

NEW ENGLAND.

THE death of Daniel Lothrop, one of the leading booksellers and publishers of Boston, occurred at his residence, 17 Beacon street, on the night of March 18th. Mr. Lothrop's health had been gradually failing for a few years past. During the last four weeks an acute kidney trouble appeared, which developed with great rapidity. He was about and at business, however, until a few days ago, when he was obliged to take to his bed. Mr. Lothrop was born in Rochester, N. H., August 11th, 1831, the son of a farmer, for whom he was named. He was a precocious scholar in mathematics, and was prepared for college at the age of 14, but was diverted from a liberal education out of regard to his health and for other reasons. At the age mentioned he took charge of a drug store belonging to his elder brother, James, with whom he shared the profits of a good business. A few years later he established drug stores at New Market and Meridith Bridge, the firm of "D. Lothrop & Co." then consisting of three brothers, pledged forever to share profits equally in whatever business they might be engaged, separately or together. In 1850 Mr. Lothrop purchased the stock of a book store in Dover and established branches in Berwick, Amesbury, and other places. The year 1856 found him in the West. He engaged in the drug business at St. Peter, Minn., the stock of which he purchased in St. Paul at a closing-out sale. Then followed business losses and health failure, and Mr. Lothrop sought physical recuperation in the South and East. He finally returned to Dover and re-engaged in the book business. Soon after the close of the civil war he moved to Boston and commenced his great career as a publisher at a store at Cornhill. He published the works of many prominent authors, and many well-known monthly periodicals emanated from his establishment. Mr. Lothrop lost heavily by the Boston fire of 1872. In 1875 he moved to the corner of Franklin and Hawley streets; 1890 saw the business transferred to the present quarters on Washington street. A wife and child survive him.

Undoubtedly it is not generally known that the world-renowned traitor, Benedict Arnold, once posed as an apothecary; but such is the fact. The selling of drugs was not his only calling, but he evidently deemed it of such importance as to place it first in order on his business sign.

The New Haven Historical Society has many Arnold relics, and prominent among them are his druggist appurtenances.

Conspicuously posted on the walls of the historical rooms is a black-painted board, with bevelled edge, on which, in large gilt capitals, may be read:

B. ARNOLD, DRUGGIST,
BOOK-SELLER, &C.
FROM LONDON.
SIBI TOTIQUE.

This is the sign used by the traitor when a druggist in New Haven previous to 1776. Possibly the Latin phrase at the bottom may have been the source from which a well-known citizen of New Haven, to whom the city is indebted for the insurance building in which the rooms of the Historical Society are at present located, drew the inspiration by reason of which many an article in the local papers of his day was signed with a familiar name and the addendum. "For Himself and Others." This allusion will be understood by all who were acquainted with the late Benjamin Noyes.

Here, too, are Arnold's mortar and pestle of white marble, in which, no doubt, were concocted many a powerful prescription of the day. They stand on a quaint little cupboard about 2 feet high, 1½ feet wide, and 10 inches deep. The door swings outward on hinges held in place by nails, which, like the hinges themselves, are made of hand-wrought iron. It was once ornamented by pieces of wood of various shapes and sizes glued to it. Just enough of them remain to hint at their ornamental de-

sign. A turn of the wooden button which fastens it and the door opens, disclosing three tiers of drawers of different shapes and sizes. There are nine in all, and each may be pulled out by the leather loop tacked to it. The portly, clerical-looking gentleman who happens to be standing near it notes the number 274, and turns to the society's catalogue which he holds in his hand.

"274," he reads, "Benedict Arnold's medicine chest, used by him on Water street prior to 1774." Almost reverently the portly stranger fingers the leather loops and pulls out hesitatingly one of the drawers. "Is it possible, is it possible," he says with unction, "that my hand touches what Benedict's once touched?" Human nature is a rum thing! Shades of George Washington and martyrs of Valley Forge!

As a rule the drug clerk is a very accommodating young man, notwithstanding all his trials, but there are times when he rebels. A Boston *Herald* reporter had just finished lighting his cigar in a Brookline pharmacy a few mornings ago when a big, stout servant girl entered. She was certainly forty, and not fair, yet she heavily weighted with a consciousness of her own importance.

"What can I do for you, madam?" said the clerk, in his most pleasing manner.

"Gimme a shtamp," was the abrupt answer.

"Certainly, madam," said the clerk; "a two cent stamp?"

"Yes, that's what I want."

While the clerk was tearing off the stamp the woman was fumbling in her skirt pocket. She finally succeeded in pulling out a soiled envelope. Holding it out toward the clerk, she demanded, threateningly:

"Stick it on."

The young man was staggered for a moment, but suddenly his manner changed, and he replied in uncompromising tones: "I guess not."

"Well, if you don't I won't take it."

"All right," said the clerk, and he put the stamp back into the drawer.

It was his turn now, and he smiled inwardly as the would-be customer blushed, then turned pale, stood first on one foot and then on the other, and, after fidgetting about for a full minute, said: "Gimme that shtamp."

"You can't have it now," was the equally determined answer.

"If you don't give it to me, I will complain of you to the post office."

"Go ahead. That stamp is my property. I paid two cents for it, and my selling it to you is purely a matter of accommodation. You can't have it for a dollar now."

The woman left the store in disgust, and the drug clerk laughed and said: "The next time she wants a stamp in a drug store she will know how to ask for it decently."

"Do you have many cases of that kind?" asked the *Herald* man.

"Well, I should say we do. Why, some people think we are obliged to sell stamps, and they feel greatly put out if we cannot accommodate them. The other night a man came in and wanted to know if I would sell him three two-cent stamps for five cents. What do you think of that?"

Hon. Gorham D. Gilman's triumph in the matter of the anti-free pass bill, referred to in the issue of March 15, is now complete. The bill has passed both branches of the Legislature and has been signed by the governor, and goes into effect at once. The members of the General Court will now have to pay or walk, thereby correcting a great abuse. Senator Gilman, who has labored with great diligence for three years to secure the passage of the bill, has received the following:

"I am directed by the governor to present to you the quill pen with which he signed the bill entitled: 'An act relating to the issuing of railroad passes and the compensation of members of the Legislature.'

Sam'l Roads, Jr., Private Secretary."

Gov. Russell added, with his own pen: "I send you the quill with pleasure."

April 1st will see J. T. Brown & Co. in their new store at 161 Tremont street. The lease of the store which they at present occupy expires on that date.

For repressive and radical legislation the cigarette bill, which was recently defeated, pleased the most chronic crank. Much comment and discussion was caused by the bill, the newspapers of the State being as a unit against it. The bill had many friends in the House, and at one time it seemed as though the Senate would have to be depended upon to defeat it; its engrossment was finally defeated in the House, however, by the substantial vote of 113 to 73. The bill appeared in this form:

Section 1. No person shall manufacture or sell, or expose for sale, cigarettes with paper wrappers, or cigarette paper in any form.

Sec. 2. Any person violating any of the provisions of this act shall be punished by a fine of $100 for each offence.

Alderman N. J. Rust, of the Rust, Richardson Drug Co., has just been reappointed and confirmed as a member of the Board of Commissioners of Sinking Funds.

During the recent cigarette agitation, Prof. James F. Babcock examined many of the brands in the market and found them free from foreign ingredients, thus exploding the popular idea that they are drugged and that the paper used on them is contaminated with arsenic and white lead.

Messrs. Charles and George Coleman, prominent druggists of the West End, are joint possessors of a dog named "Jack," of which they are very fond. Some of their friends conceived the idea of having "Jack's" picture painted; and, unbeknown to the owners, the plan was carried into execution. The presentation took place on the evening of March 15th at Brannigan Hall on Court street; the recipient, Mr. Charles Coleman, being much pleased and surprised. A bountiful collation closed the pleasantries of the occasion.

Mr. T. C. Barden, a South Boston druggist, is being brought to the front by friends for the vacancy in the school board.

The recent attempt to amend the poison law by adding after Section 1, "or proprietary medicines properly labelled for external use only," was a piece of snap legislation. The call for the hearing read as follows: "To amend Chapter 209 of the Public Statutes." Those who were present were much amused at the committee's dilemma when it was found that Chapter 209 referred to "Offences against Public Policy." President William W. Bartlet, of the Massachusetts Druggists' Alliance, who was present, aided them in their dilemma by suggesting that Chapter 209 of the Acts of 1888 was the chapter which the author of the amendment undoubtedly intended. Mr. Bartlet pointed out that the amendment as drawn lacked meaning when applied to this chapter, and suggested that as there was no public demand or necessity for the amendment, it be dropped, which was done. The intent of this proposed amendment was to make it a crime to sell a patent medicine for internal use which contained anything in the nature of a poison, without its being properly labelled, which would involve a great hardship upon the trade; happily the action of the Public Health Committee has defeated this offensive and nefarious scheme.

John A. Rice, of North Adams, a highly esteemed druggist, has been appointed on the Board of Pharmacy.

Dame Rumor has it that Roxbury is to have two new pharmacies. It is said that one will be located at the corner of Greenville and Dudley streets, and that the other is to be on Warren street at the corner of Glenwood. It is expected that a prominent firm of "cutters" will run the latter store.

The wooden factory at 95 Border street, operated under the name of the "New England Drug and Spice Mills," was badly damaged by fire on the morning of March 10th. Just how the fire started no one seems to know. Some lay the blame to the friction of the machinery, and others claim that a spark from one of the neighboring mills caused the trouble.

The first the employees—three men and a boy—knew of the trouble was when they were startled by a sudden flash of flame, which came from the rear of the ground floor of the factory, and which almost instantly enveloped the whole building.

The employees had no time to secure their clothing or

personal effects, and two of them were obliged to jump out of the rear second-story windows in order to escape. The firemen were summoned, and after a half-hour's hard fight extinguished the flames without allowing them to spread further. Mr. L. L. Harris, the proprietor, says that he had a $25,000 stock of drugs on hand. A great deal of this was destroyed, and his loss will probably reach $10,000. He carries but about $3,000 worth of insurance.

D. G. BURR, who succeeded A. H. Bartlett at Gilman Bros'., has been with the firm for twenty-five years.

An error was made in your last issue in referring to the arrangements for the Massachusetts State Pharmaceutical Association meeting. It was the coming meeting of the American Pharmaceutical Association at the Profile House, New Hampshire, and the festivities which are to be given in this city prior to the meeting, which should have been spoken of. The arrangements for the entertainment of guests in this city include carriage and boat rides, the whole to conclude with a banquet at the Hotel Vendome on the evening of July 12th. It is hoped by the committee on arrangements that many druggists will so shape their plans as to reach this city on Sunday, July 10th, and remain here until the 12th, in order to participate in the entertainment which will be provided.

The Board of Registration in Pharmacy has many applications for examinations, and frequent sessions will be held until midsummer to accommodate those who wish to appear before the board.

CAPT. WHITE evidently believes that if druggists want to retail liquor they should pay $1,000 for a first-class license, instead of $1 for the sixth class. Acting on this belief, he has made some of the Charlestown druggists extremely uncomfortable because of his persistent attacks upon their Sunday bar rooms in the rear, and because of other modes of prosecution.

He appeared before the police board recently to complain of the firm of George H. Brayton & Co. of 57 Cambridge street, Charlestown, whom he charged with selling liquor without a prescription. The principal witness in the case was a citizen, and the defence of the druggist firm was a strenuous denial. The matter was taken under consideration.

At a meeting of the Trustees of the Massachusetts College of Pharmacy, held on March 15th, Prof. GEORGE F. H. MARKOE—at present in charge of the department of general chemistry—was elected to fill the vacancy in the department of pharmacy caused by the resignation of Prof. Edgar L. Patch. This is the chair which Prof. Markoe held from the spring of 1867 to 1879, when he succeeded Prof. Merrick in the department of chemistry. At the same meeting it was voted to separate the pharmacy department from the pharmaceutical laboratory, and have a different head for the latter department.

Formerly the professorship in pharmacy was combined with that of Director of the Pharmaceutical Laboratory.

Officers of Station 5 on March 13th, with a warrant, searched the apothecary store of A. T. LUSCOMB, No. 449 Tremont street, and seized 6 gallons of whiskey, 5 gallons of wine, a half gallon of brandy, and a quart of rum.

ENGLAND.

THE death is just announced of Prof. Theophilus Redwood, Ph.D., F.I.C., F.C.S., which took place on March 5th at his residence in Wales. The loss to pharmacy, and English pharmacy in particular, is a grievous one, for, although in his eighty-seventh year, Dr. Redwood's faculties and abilities were but little impaired. It was only last September that reference was made in these columns to his active interest in the meeting of the British Pharmaceutical Conference when it met at Cardiff.

Prof. Redwood was born at Boverton, Glamorganshire, South Wales, on March 2d, 1806. In 1823 he was apprenticed for three years to the firm of John Bell & Co., the well-known dispensing chemists of Oxford Street, London, with whom he remained for over seven years. In this time he had passed through the various stages, until he was managing assistant, and, closely associated as he was with Jacob Bell, the eldest son of the head of the firm, they attended together the lectures of Brand and Faraday, and later on of Prof. Graham. After leaving Bell's establishment Mr. Redwood started a dispensing business of his own in a suburb of London, but afterwards disposed of it to engage in the more congenial work of manufacturing chemicals and pharmaceutical preparations. Much of his attention was directed towards the manufacture of extracts *in vacuo*, and he labored hard to perfect these preparations. Mr. Bell, in the meantime, had become identified with the newly started Pharmaceutical Society, and, desiring to advance its interests, introduced the *Pharmaceutical Journal*, becoming editor himself, with Mr. Redwood as sub-editor. The delivery of courses of lectures on chemical and pharmaceutical subjects was arranged by the Society, and Mr. Redwood became the professor of pharmacy. On the retirement of Prof. Fownes from the chair of chemistry, Dr. Redwood was nominated professor of chemistry and pharmacy, and the laboratory for practical chemistry was also under his charge. For many years his days were spent in superintending and directing the studies at Bloomsbury Square, whilst the evenings were devoted to journal work. In 1844 he undertook to produce a new edition of Gray's Supplement to the Pharmacopœia, which was entirely rewritten, and when it appeared in 1847 was very popular and ran through three editions. His aid was next requested with the Pharmacopœia, the 1867 edition of which was almost entirely his work; and the subsequent editions of 1874 and 1885 still found him as principal editor. In conjunction with Prof. Bentley he undertook the reproduction of Pereira's great work, "The Elements of Materia Medica and Therapeutics," in 1870, and at the same time relinquished the editorial work in connection with the *Pharmaceutical Journal*. During the whole of this time, and indeed up to the day of his death, Dr. Redwood was an analytical and consulting chemist with a large practice. He made the necessary analyses and investigations for the Government, assisted by Profs. Graham and Hofmann, which led to the introduction of methylated spirit for manufacturing purposes free of duty. For the years 1876 and 1877 he was president of the British Pharmaceutical Conference, and in 1880 completed the book, "The Rise and Progress of Pharmacy," first commenced by Jacob Bell.

At the close of the session of the School of Pharmacy in 1885, Prof. Redwood intimated his desire to retire from the chair which he had occupied for forty-four years. The resignation was regretfully accepted by the Council of the Pharmaceutical Society, who unanimously elected him emeritus professor. His admirers and late pupils then collected a sum of money to establish a scholarship to perpetuate his name, which is awarded annually to the best candidate.

The convenience, reliability, and elegance of compressed tablets have been publicly acknowledged by Dr. Parke in his book on Equatorial Africa, just issued from the press. Surgeon Parke became famous as soon as H. M. Stanley published his history of the Emin Pasha Relief Expedition. On his return to this country Surgeon Parke received quite an ovation, and was promptly promoted to the Life Guards as medical officer in charge. In the peace and quietness of this honorable but by no means arduous post he has written his experiences of that memorable expedition. The following passages from his book will be read with some interest, as the modest and retiring doctor delivers himself with no uncertain voice in favor of these compressed drugs: "My chief Harri calls out 'Dowe, dowe, dowe,' morning and evening; and the sick then come crowding round me as I sit in my chair and dole out tabloids, which are superior to any form of medicine that I have tried, not only for efficiency and constancy of strength—as I have repeatedly noticed—but also for extreme convenience of transport and rapid dispensing." The doctor then adds a strong recommendation, which the Army Medical Department will probably ignore: "I hope that the medical department of her Majesty's service may see their way to adopt this form of medicine. I can say with confidence—from experience of over ten years in the medical staff of the army, both at home and abroad, in peace and war, including this expedition—that one man could carry a larger quantity of

more efficient medicines in the tabloid form than ten can manage in the present cumbersome system used by the services. If the tabloid system were only adopted on service abroad, see what a difference of transport and space there would be! These tabloids are soluble and the doses accurate; why still patronize the pill with its indefinable charm, which becomes concrete and insoluble (and therefore useless) when kept a long time, and the dignified antiquity of those fluids and powders, which are most difficult to pack and dispense? But the most convincing ground of appeal to the authorities must be expenditure, for the estimates would be lessened—as one medical officer could do the work of two, and dispensers be themselves almost entirely dispensed with."

Now, although there is much that is accurate and reasonable in Dr. Parke's remarks and recommendations about compressed tablets or tabloids, yet, as I have stated, they will probably be altogether ignored. In the first place, for many years the Army Medical Department have used compressed tablets, and quinine itself was compressed into four-ounce flat square cakes for convenience of transport and storage before Dr. Parke was in the service. Ten years ago the field companions and haversacks of the medical corps contained compressed tablets of Dover's powder, of aromatic confection, of Gregory's powder, and several others. It is true that they were not handsome samples of compressed goods, and the method of packing them was defective; but they were nevertheless employed, and, if I mistake not, are still used to this day. The appeal, on the ground that by a more general use of compressed goods a reduction in the number of medical officers and dispensers employed could be effected, is ingenious but hardly accurate. The large medical stores at Woolrich are fitted up for the reception of tinctures, liquid extracts, syrups, etc., and so are the medical panniers, pharmacy wagons, etc., used in war, and the adaptation of these to compressed tablets would incur a far greater expense than the saving suggested by Dr. Parke. There is no doubt, however, of the value of this class of medicines in forced marches.

The preparation of a miscible liquid extract of cascara has long been a desideratum, and now, through the generosity of Mr. John Moss, F.I.C., F.C.S., has been made feasible. For some years past Mr. Moss has been working on cascara and other varieties of rhamnus, and, in consequence of his results, introduced and advertised a miscible liquid extract. At the same time he published the formula, which practically amounted to a proof spirit tincture of the new bark. Whilst this preparation undoubtedly precipitated less than the B. P. liquid extract did on dilution with water, it was not free from all turbidity. Continuing his work, Mr. Moss has recently published a further research, by which he claims to produce a miscible liquid extract free from the usual nauseous taste. Briefly, the method consists in exhausting the crushed bark by percolation with cold water, evaporating this liquid to dryness on a water bath, and redissolving when cold with water. This is filtered and evaporated to a sufficient quantity, so that the addition of 25 per cent of alcohol will make the final preparation of the strength 1 in 1.

London Market Report.

MINCING LANE, March 12th, 1892.

The market has settled down again after the excitement in several articles produced by the influenza scare. There has been a fair demand, and prices are well maintained. Ergot is quiet and ipecacuanha will probably give way somewhat. Opium is very flat, but oil of lemon. citric acid, menthol, and japanese oil are all dearer, Current prices as follows:

Acid, Citric	per lb., $0.35	Mercury	per lb., $0.38
Tartaric	" .23	Calomel	" .63
Bleaching Powder	per cwt., 1.88	Corrosive	" .56
Camphor, refined	per lb., .35	White precip.	" .66
Chlorate of Potash	" .14	Oil Lemons	" 2.40
Copper Sulphate	per cwt., 3.48	Peppermint Jap.	" 1.20
Ergot, Spanish	per lb., .60	Quinine	per oz., .20
Belgian	" .49	Senega Root	per lb., .41
Ginger, Jamaica	" .12	Squilt	" .07
Jalap	" .40	Sulphur Flowers	per cwt., 2.04
Menthol	" 2.04	Roll	" 1.78

GENERAL.

MESSRS. WILSON & FRAZEE is a new firm in Lexington, Ky., having succeeded J. F. Edgar & Co. Both are energetic young men, who are now changing clerkships for proprietorships. They are making many and pleasing improvements internally, and will have one of the neatest stores, as they have already one of the best locations, in the city.

MR. J. C. RISDON, Knoxville, Tenn., March 1st purchased the interest of his partner, Mr. A. M. Caulkins. Instead of Caulkins & Risdon the firm will hereafter be J. C. Risdon.

DR. G. W. WALLS, formerly of Miamisburg, O., has moved his stock and fixtures within the past two weeks to Bedford, Ind., and opened a pharmacy there.

Mr. A. H. FEHRING, who for the past three or four years has been clerking in Cincinnati and vicinity, has recently opened a very neat store in Columbus, Ind. With a good stock, good location, and good knowledge of the business, his prospects for success are most excellent.

Druggists have been frequently haled into court for various offences, real or imaginary, against local statutes, principally for alleged violations of the liquor laws, or in violation of some vested rights of a proprietary medicine manufacturer, but it remains for a druggist of Uniontown, Ky., to stand alone and unique in his position of culpability. Possibly it may be due to the fact of its being a sort of an all-round drug business combined with general store. The person referred to has recently assigned. Judging from the fact that his assets are said to be $30,000 and liabilities but $1,000, it looks like an attempt to evade payment of judgment in a suit recently brought and decided against him.

The plaintiff claimed that in 1870 he purchased of the defendant a ticket in the Louisiana lottery. The latter found out that the ticket had drawn a capital prize, and drove into the country to see him, telling him that the drawing had not come off, and that by mistake he had been given another man's ticket.

Suspecting nothing wrong, the holder of the ticket exchanged, only to find out subsequently that he had been defrauded. The jury brought in a verdict for $3,750. There would seem to be good reason to suppose that there would be no longer any usefulness in the State of Kentucky at least for that kind of druggist.

MESSRS. CLARKE & LARY opened not long since a very handsome new drug store corner Main and 5th streets, Paris, Ky.

In a drug store in Illinois, a short time since, were congregated three citizens of the place. Some one asked very appropriately if it was a live-stock market. Their names were Veal, Lamb, and Shoat. Truth is sometimes stranger than fiction.

The American Analyst has recently established a club for the financial benefit of its subscribers, which is to be known as the "American Analyst Club." The membership is limited to subscribers to that journal, and entitles them to obtain articles of ordinary use, under a guarantee of excellence, from one-quarter to one-half their usual retail price.

Aromatized Castor Oil.—According to Dr. Standke (in *Deutsch. med. Wochenschr.*), aromatized castor oil may be prepared in the following manner:

Treat castor oil of the best quality repeatedly with boiling water. Then add to it a sufficient quantity of saccharin to impart to it the taste of a weak syrup. Lastly, add a trace of oil of Ceylon cinnamon and a little vanilla (extract or tincture), which will cover the rest of the oily taste.

The New U. S. Coins.—It may be useful to our readers to recall the fact that the U. S. fractional silver currency bears a simple relation to the metric system, which relation has been made designedly and by law.

The half dollar is equal to	12½ Gm.
The quarter dollar is equal to	6¼ "
The dime is equal to	2½ "
84 half dollars are equal to	1 kilo.